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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/735,078	12/11/2003	Bruce H. Weiller	D502.	1281

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EXAMINER

OLSEN, KAJ K

ART UNIT PAPER NUMBER

1753

DATE MAILED: 12/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/735,078

Applicant(s)

WEILLER ET AL.

Examiner

Kaj K. Olsen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-10 is/are rejected.
- 7) ☒ Claim(s) 3 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: On page 2 of the specification, applicant refers to a copending application, but did not include the information about that copending application. Applicant must include that information in response to this office action.
2. With respect to the remainder of the specification, the copy of the specification in the file repeatedly has missing letters or smudged lines. For example, the letter “e” is missing in “affect” on p. 4, l. 27. Letters are also missing on p. 5, l. 3; p. 6, l. 2; p. 7, ll. 1 and 27; p. 10, l. 3; p. 12, l. 3; p. 16, l. 2; p. 17, l. 1; and p. 27, l. 3. With respect to the smudging, the examiner also notes that line 25 of the disclosure is repeatedly smudged, especially pp. 3, 6, 7, 11, 12, 16, 27, 18, 21 and 24. The examiner does not believe that this was an error with the scanning process and believes the problem originated with the source document. The examiner requests correction. Due to large number of pages and paragraphs affected by this problem, the examiner recommends the applicant correct the disclosure via a substitute specification.

Appropriate correction is required.

Claim Objections

3. Claims 4 and 10 are objected to because of the following informalities: In claim 4, l. 3, the letter “e” is missing from “nanofibers”. In claim 10, l. 2, the letter “e” is missing from “polyaniline”. This would appear to be an extension of the problem with the specification (see above). Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

5. Claims 1, 2, 4 and 5 are rejected under 35 U.S.C. 102(a) as being anticipated by Briseno et al (Polymer Preprints 2003, 44(2), p. 140). Briseno was published on 8-11-2003.

6. Briseno discloses a chemical vapor sensor comprising a film of polyaniline nanofibers over gold-coated glass substrates having a gap of 0.125 cm. See “Preparation of PAni Sensors” in col. 1. This combination of elements would read on the claimed “positive terminal”, “negative terminal” with a film of conductive polymer nanofibers extending between the two terminals. In addition, the exposure of the chemical vapor to the polymer produces a change in conductivity (expressed as a change in resistance). See fig. 1.

7. With respect to the choice of chemical vapor, n-butylamine is a basic vapor.

8. Claims 1, 2, 4 and 5 are rejected under 35 U.S.C. 102(e) as being anticipated by Pinto et al (Applied Physics Letters, 83 (20), pp. 4244-4246). This paper has a publication date of 11-17-2003.

9. Pinto discloses a device comprising two gold terminals that would read on the defined “positive terminal” and “negative terminal” with a film of organic conductive polymer nanofibers extending between the positive and negative terminals. See fig. 1 and 2 and the paragraph bridging pp. 4244 and 4245. With respect to the device of Pinto being a sensor for

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sensing chemical vapor, that is only the intended use of the apparatus and the intended use need not be given further due consideration in determining patentability. With respect to the terminals being “adapted for interconnection to an electrical monitor”, all this claim limitation sets forth is that the terminal would be capable of being connected to an unclaimed electrical monitor. In this case, the terminals of Pinto are clearly capable of being connected to an electrical monitor in view of the electrical measurements shown in fig. 3. With respect to the film being “for producing a change in conductivity between” the two terminals, this is an inherent property of polyaniline nanofibers as evidenced by the instant invention.

10. With respect to the specified chemical vapor, that is only the intended use of the apparatus and the intended use need not be given further due consideration in determining patentability.

11. Claims 1, 2, 4 and 5 are rejected under 35 U.S.C. 102(b) as being anticipate by Yun et al (Proceedings of SPIE, vol. 5220 Nanofabrication Technologies, pp. 37-45). The conference that this disclosure was presented at was held on 8-3-2003. The examiner is utilizing that date as the effective date of this disclosure.

12. Yun discloses a sensor comprising two gold terminals reading on the claimed “positive terminal” and “negative terminal”. These terminals are also disclosed as being adapted for interconnection to an electrical monitor as evidenced by the data shown in fig. 6. Yun also discloses a bundle of nanowires comprising polyaniline be extended across the positive and negative terminals. See fig. 1 and 3, table 1 and the paragraph bridging pp. 42 and 43. The examiner believes that a bundle of nanowires comprising polyaniline would read on the defined “conducting polymer nanofiber” giving the claim language its broadest reasonable interpretation

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because the examiner can find no fundamental distinction between a “nanowire” and a “nanofiber”. Moreover, the bundle of nanowires of Yun would also meet the defined “film” of material because it is been deposited over some amount of area (see fig. 1 as an example). With respect to the sensor being for the sensing of chemical vapor, that is only the intended use of the apparatus and the intended use need not be given further due consideration in determining patentability. With respect to the film “producing a change in conductivity between the positive and negative terminals”, this is an inherent property of polyaniline nanofibers as evidenced by the instant invention.

13. With respect to the specified chemical vapor, that is only the intended use of the apparatus and the intended use need not be given further due consideration in determining patentability.

14. Claims 1, 2 and 4-9 are rejected under 35 U.S.C. 102(a) as being anticipated by Liu et al (Chem. Eur. J. 2003, 9 (3), pp. 604-611). Liu has a publication date of 2-3-2003.

15. Liu discloses a sensor comprising a working and counter electrode that would read on the applicant’s set forth “positive terminal” and “negative terminal”. Liu discloses coating one of the electrodes with a film of conductive polymer nanofibers of polyaniline. See fig. 1 and p. 606. This film of nanofibers shown in fig. 1 is between the two electrodes (i.e. the two terminals) and would read on “extending between” giving the claim language its broadest reasonable interpretation. With respect to the sensor being for the sensing of chemical vapor, that is only the intended use of the apparatus and the intended use need not be given further due consideration in determining patentability. With respect to the polymer film “producing a

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change in conductivity between the positive and negative terminals”, this is an inherent property of polyaniline nanofibers as evidenced by the instant invention.

16. With respect to the use of gold, see p. 606, col. 2.

17. With respect to the specified chemical vapor, that is only the intended use of the apparatus and the intended use need not be given further due consideration in determining patentability.

18. With respect to the specified diameters and lengths of the claims, see p. 607, col. 1.

Claim Rejections - 35 USC § 103

19. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

20. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

21. Claims 1, 2, 4-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ko et al (USP 2003/0137083) in view of Shiell (USP 4,267,506).

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22. Ko discloses a formation of a film of conductive polyaniline nanofibers for use for devices such as sensors or actuators. See paragraph 0016. Ko further discloses monitoring the resistivity of the film via a four-point probe. See paragraph 0020. Ko does not disclose any structure for this four-point probe. Shiell discloses a conventional four-point probe known in the art. It comprises four terminals that are placed on the surface of the device being monitored. See fig. 8 and col. 5, ll. 34-56. Utilizing a four-point probe, like that shown by Shiell, across the surface of a film of Ko would read on the claimed “positive terminal” and “negative terminal” with a film of conductive polymer nanofibers extending between the terminals. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize a four-point probe, like that taught by Shiell, for the film of Ko because Ko explicitly suggested doing so for the purpose of monitoring the resistivity of the film. With respect to the sensor being for the sensing of chemical vapor, that is only the intended use of the apparatus and the intended use need not be given further due consideration in determining patentability. With respect to the film “producing a change in conductivity between the positive and negative terminals”, this is an inherent property of polyaniline nanofibers as evidenced by the instant invention.

23. With respect to the specified chemical vapor, that is only the intended use of the apparatus and the intended use need not be given further due consideration in determining patentability.

24. With respect to the use of gold, gold would have been an obvious choice of probe material (at least as a coating) owing to the high conductivity and inertness of gold as well as its softness that would allow good electrical connection.

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25. With respect to the various claims concerning diameter, length, and distributed diameter, Ko urges that the parameters for electrospinning can be varied to control these various fiber properties. See paragraph 0015. Varying these parameters to arrive at a film having these fiber properties would have required only routine skill in the art.

26. Claims 1, 2 and 4-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al (USP 2003/0217928) in view of Marsoner et al (USP 5,130,009).

27. Lin discloses a sensor comprising a positive terminal 12 and a negative terminal (13 or 14). Because Lin is disclosed as a sensor (see fig. 5 and paragraphs 0093-0095), these terminals are clearly adapted for interconnection to the electrical monitor. Lin further discloses the presence of a film of conductive polymer nanofibers on one of the terminals (i.e. electrode 12) of the sensor. See paragraphs 0078-0080. This does not read on the claim limitation requiring the film to extend between the positive and negative terminals. However, it is conventional to the sensing art to locate a counter or reference electrode directly across from the working electrode. This is demonstrated by Marsoner, which shows that the reference electrode 23 is placed directly across from the working electrode 13 so as to reduce the electrochemical volume of the sensor cell. See fig. 1 and col. 2, ll. 35-42. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Marsoner and place one or both of the reference and/or counter electrodes across from the working electrode so as to reduce the electrochemical volume of the sensor. Placing either the counter or reference electrode of Lin across from the working electrode would then thereby read on having the film extend between the positive and negative terminals. With respect to the use of the device for sensing a chemical vapor, that is only the intended use of the apparatus and the intended use need not be

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given further due consideration in determining patentability. With respect film producing a change in conductivity between the positive and negative terminal, Lin utilizes polyaniline like the instant invention and the instant invention evidenced that polyaniline inherently produces a conductivity change.

28. With respect to the use of gold, see paragraph 0042 of Lin.

29. With respect to the choice of chemical vapor, that is only the intended use of the apparatus and the intended use need not be given further due consideration in determining patentability.

30. With respect to the choice of diameters and range of the diameters, controlling the various lengths, diameters, and distributed diameters to arrive at the desired sensing qualities for the sensor requires only routine skill in the art.

31. Claims 6-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pinto, Yun or Briseno.

32. Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu.

33. With respect to claims 6-8, the various above prior art references (except Liu) set forth all the limitations of the claims (see rejections above), but did not explicitly recite the various lengths and diameters for the polymer nanofibers. However, arriving at the desired lengths and diameters for the various fibers requires only routine skill in the art. Similarly with respect to claims 9 and 10, arriving at a desirable or acceptable level of diameter distributions also requires only routine skill in the art.

Allowable Subject Matter

34. Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

35. The following is a statement of reasons for the indication of allowable subject matter: The prior art does not disclose nor render obvious all the limitations of claim 1 and further comprising the placement of a thiol surface layer between the terminals and the film.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaj Olsen whose telephone number is (571) 272-1344. The examiner can normally be reached on Monday through Thursday from 5:30 A.M. to 3:00 P.M. and on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen, can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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December 8, 2005

A handwritten signature in black ink, appearing to read 'Kaj K. Olsen', with a stylized, flowing script.

KAJ K. OLSEN
PRIMARY EXAMINER